Chapter 1. Concepts Underlying Organizational Effectiveness: Trends in the Organization and Management Science Literature

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Since organization and management science emerged in the early 1900s in conjunction with the industrial revolution, an evolution has occurred in concepts about the nature and function of organizations and the criteria for organizational effectiveness. These concepts have grown and evolved in dynamic interaction with the organizations and institutions that have become the companies, governmental agencies, and not-for-profit organizations of today's increasingly global society. From almost nothing at the turn of the twentieth century, organization and management science has become pervasive at the turn of the twenty-first, represented prominently in colleges and universities, libraries and bookstores, and in the training classes of public and private sector organizations alike.

Over the course of this 100 year history, core concepts have been developed and disseminated – about individuals and organizations, workers and managers, systems and networks – that have shaped the thinking and behavior of managers, employees, and policy-makers alike. As with all science, present understanding is built upon past thinking and research. Familiarity with the origin and evolution of the concepts, models, and rules-of-thumb upon which contemporary perspectives of effective organizations and management are based can help managers of publicly funded science organizations think more creatively about their own organizations and management strategies.

Organizations that fund and direct science as well as the laboratories, universities, and other organizations that conduct scientific research are under growing pressure to demonstrate effective management, provide greater accountability, and accomplish more with fewer resources – to improve their effectiveness. Managers in these organizations, though tending to think of themselves as scientists first and managers second, are nevertheless being called upon to address issues of *organizational* and *system* effectiveness and to be innovative not only in the scientific research their organizations sponsor or conduct but also in the design and management of their organizations.

This chapter provides a very brief description of the major concepts and trends in the organization and management sciences, highlighting the seminal works and key contributors in these fields of research. The interplay among individuals (and theories about how individuals behave and are influenced), organizations (and theories about how organizations are formed and operate), and more recently, the broader scientific system is central in these sciences; managing that interplay is crucial to organizational and managerial effectiveness in publicly funded science. The key dimensions of organizational design and management are identified, followed by a brief overview of the major concepts and definitions of organizations and their associated management strategies. Next, the chapter addresses fitting organizational designs to the specific circumstances of each entity, resulting in multiple models of both organization and management. The concluding section summarizes the emerging new logic of organization and management and compares it with the prevailing logic of the earlier periods.

Key Dimensions

Organizations are composed of individuals and operate within systems. *Individuals*, *organizations*, and *systems* constitute the principal units of analysis of the organizational and management sciences, albeit always from an organizational perspective (i.e., the individuals of interest are within an organization or set of organizations). For each unit of analysis, as shown in Figure 1, attention can be focused *internally* (within the organization) or *externally* (on the external environment or on interactions with the external environment), though, as discussed below, concepts about both the nature of the organization and its relationship with the external environment have undergone dramatic change over the course of the last 100 years.

Focus of Attention/ Interaction	Unit of Analysis		
	Individual	Organization	System
Internally -- Within the Organization			
Externally -- With the External Environment			

Figure 1. Different Perspectives on Organizations and Management

As Morgan (1997) vividly describes, there are numerous ways to conceptualize and model an organization, with profound consequences for criteria of effectiveness. These concepts typically deal with *organizational form and structure* on the one hand and *organizational functions and activities* on the other. How the organization is designed and how its functions are defined obviously have important implications for how processes and people are managed. If, for example, managers think of the organization as a machine for the efficient production of products (whether these are widgets, services, or research results), then management controls will seek to maximize production and standardize products for efficiency. If the organization is seen as flux and transformation, then "the fundamental role of managers is to shape and create 'contexts' in which appropriate forms of self-organization can occur" (Morgan 1997:267).

Dooley (1997:69) has observed that the "prevailing paradigm of a given era's management theories has historically mimicked the prevailing paradigm of that era's scientific theories." During the nineteenth and early twentieth centuries, organization and management theories held reductionism, determinism, and equilibrium as core principles (the organization as a machine metaphor), and accorded management near total authority over the workplace. As science has developed theories of complexity and adaptive self-organizing systems, organization and management science have increased their emphasis on organization-external environment interactions, participation, worker motivation, and the dynamic aspects of change, adaptation, and learning (Morgan 1997; Wheatley 1992), placing a high priority on balancing technical aspects of organizational design with consideration of the needs and interests of the workers and the use of management models that emphasize support and participation (Mayo 1945; Likert 1961; McGregor 1960; and Trist 1981).

The organization and management sciences are interrelated disciplines, differing primarily in the extent to which they focus on the individual, the organization, or the system as the principal unit of analysis. Organization science, which typically focuses on the organization, deals primarily with organizational models, organizational design, organizational structure, organizational

functions, inter-organizational relations, organizational fields, and the organizational environment. Management science, which typically focuses on the individual and relations among individuals, is principally concerned with the management of organizational functions, organizational employees, and increasingly, the organization's external stakeholders and environment. Although their viewpoints and emphases differ, the two sciences have evolved in close proximity and share many of the same concepts, models, and trends. The following discussion juxtaposes trends in the organizational sciences literature concerning the basic concepts and definitions of organizations with their counterpart trends in the management sciences literature concerning management roles and strategies.

Basic Concepts and Definitions of Organizations and their Associated Management Strategies

Over the course of the last 100 years, the overall trend in thinking about organizational form and structure has been toward greater recognition of organizational and system complexity and organizational diversity while the overall trend in thinking about organizational and management functions and effectiveness has been away from the generic toward the more unique and tailored. It is generally agreed that these trends reflect both changes in the nature of organizations and their external environment (toward more complexity, greater variability, and faster change) and an increased sophistication of thought gained from theory developments and empirical investigation (March and Simon 1958; Blau and Scott 1962; Grusky and Miller 1970; Mintzberg 1979; Scott 1987; Barnard 1938; Dessler 1982; Drucker 1985). Richard Scott's (1987) *Organizations: Rational, Natural, and Open Systems* and Gareth Morgan's (1997) *Images of Organizations* provide highly readable, and very widely cited, summaries of the major organizational models and constructs. As Morgan notes, emerging concepts and models of organizations rarely completely replace earlier ones. Instead, they tend to create a richer context within which to reinterpret the earlier concepts and their role in a broader, more complex framework. Bureaucracies persist, for example, but become only part of the organizational and conceptual landscape that includes other structures and multiple objectives.

Closed Rational Organizations and Bureaucratic, Control-Oriented Management

From approximately 1900-1930, organizations were typically viewed as closed, rational systems (Scott 1987). The closed system perspective is characterized by a focus on internal interactions and an emphasis on organizational order and control. Organizations are seen as most appropriately directed toward attaining specific goals through formal, rational means. Individuals in these organizations are seen as capable of, indeed driven by, rational decision making. Effectiveness, from the closed, rational system perspective, is achieved through:

- Setting specific goals
- Prescribing the behavioral expectations of organizational participants through formalization of rules and roles
- Monitoring conformance to these expectations.

Management, at this time and for this model of organization, is oriented toward the establishment of bureaucratic organizational control.

These complementary perspectives originated with Weber, Taylor, and Simon. Max Weber (1946 translation) wrote in the early 1900s that *bureaucracy* was the most effective and efficient organizational form because the bureaucratic rational-legal structure provided the basis for stable

and predictable behavior on the part of both subordinates and superiors. In this model, the behavior of subordinates is rendered reliable through the division of labor, the specificity of role obligations, and the clarity of hierarchical authority relations (Weber in Eisenstadt 1968). In order to prevent superiors from behaving arbitrarily or capriciously, the formalization of role expectations for subordinates is combined with a specification of management authority within narrowly prescribed hierarchical authority relations. The organizational and management goal is to increase system rationality and predictability.

The concept of management control was furthered by Frederick Taylor's (1911) notion of *scientific management*, which consisted of rationalizing organizational behavior through extensive and detailed task analysis, systematization, and routinization. This concept, which came to be called *Taylorism* (or, when applied to factories such as those of Henry Ford, *Fordism*), continued to influence concepts of effectiveness – and management strategies, functions, and tools – well into the latter part of the century. Herbert Simon (1957; 1979) emphasized a more subtle form of control, referred to as *administrative control*, in which the role of management was to eliminate complexity by simplifying decisions and developing systems to support organizational participants in making the decisions each needed to make. Simon's form of administrative control is a somewhat less obtrusive form of bureaucratic control than scientific management. Simon is also well known for introducing the concept of *bounded rationality*.

Consistent with this view of a closed, rational organization, the early management literature also assumed that organizations were fairly generic. For example, Drucker (1985:17) described management as "a generic function, which faces the same basic tasks in every country and, essentially, in every society." Although there is some variation in the functional tasks identified by the different management theorists (Barnard 1938; Dessler 1982; Drucker 1985; Stoner 1978; Davis et al. 1992), all assumed a core set of management functions applicable to all organizations. These generic functions included:

- Defining mission and establishing purpose and goals
- Leading and motivating
- Strategizing and planning
- Structuring, organizing, and designing
- Controlling and establishing roles and authorities
- Setting performance standards and value expectations
- Staffing, developing, and managing human resources
- Budgeting and allocating resources
- Evaluating, learning, and improving
- Managing external relations.

Interestingly, one of the most widely used tools for assessing organizational effectiveness, the Malcolm Baldrige Quality Award (1999), still reflects this basic, generic approach. The seven Baldrige performance criteria (leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process focus, and business results) capture the critical organization/management functions identified in the early literature, albeit in slightly different groupings.

Toward the end of this period, organizational theorists started to question the fundamental premise of increasing system rationality through promotion of stable patterns of behavior and reduction in the scope of decision making authority. Excessive emphasis on internal control and

stability came to be seen as irrational, and the attempt to program in advance the behavior and decisions of organizational participants came to be viewed as misguided, even foolhardy. It was argued that such rigid programming could easily become maladaptive, giving rise to a *trained incapacity* that, in turn, would contribute to both ineffective and inefficient organizational performance (Veblen 1904; Merton 1957). Perrow (1986) crystallized this position, arguing that the appropriateness of an internal control focus is affected by the degree of organizational complexity and uncertainty: An internal command and control orientation may be effective when task complexity is low, but is less feasible in highly complex organizational systems. Similarly, when the external environment is complex and uncertain (i.e., there is a rapid pace of change and high level of competition) an internal command and control approach may be inappropriate because it restricts the organization's flexibility and limits its ability to adapt to the changing demands and opportunities.

Natural Systems and Management Emphasis on Engaging the Hearts and Minds of Organizational Participants

Increasing recognition of the limits of the rational system perspective led to the emergence of the *natural system* perspective, which became the prevailing model from the 1930s through the 1950s (Scott 1987:115). In contrast to a rational system perspective, the natural system perspective views organizations as first and foremost social collectivities whose primary interest is the survival of the system. A natural system perspective stresses the need for the organization to harness the minds and hearts of its participants and emphasizes the importance of informal social relations over formal structures (Likert 1961; Weick 1999). In tandem, management science was also gradually moving away from an emphasis on command and control to an emphasis on engaging the hearts and minds of the organizational participants. The *human relations perspective*, initially associated with Mayo, initiated this view. Mayo (1945) is best known for the pivotal studies, triggered by the famous *Hawthorne Effect*, that demonstrated commitment and loyalty were often more important than self-interest and formal sanctions in determining the behavior of organizational participants. The human relations school gave rise to a large body of work directed at informal, normative structures; organizational cooperation; organizational culture; leadership; motivation; morale; and, later, teamwork (Barnard 1938; Goffman 1961, 1974; and Peters and Waterman 1982). This management perspective has since been expanded to include efforts to engage not only the hearts and minds of organizational participants but also those of the organization's customers and external stakeholders (Porter 1985; Powell 1990). These efforts contributed to the development of the literature on team work (see Chapter 8), organizational alliances and partnerships (see Chapter 9), participative management (see Chapter 10), and leadership (see Chapter 12).

Open Systems and Management's Function as Leader and Enabler

The natural system view, in turn, led to an open system perspective that focused greater attention on the organization's interaction with its external environment. This perspective became prominent in the early 1960s (Scott 1987:115; Blau and Scott 1962). Basically, an open system self-maintains on the basis of *throughputs* taken from and given back to the environment. This view stresses that an organization involves inputs – throughputs – outputs. Open systems are also characterized by two basic interlocking sets of system processes: *morphostasis* and *morphogenesis* (Buckley 1967). Morphostasis refers to processes that preserve or maintain a system's given form, structure, or state (in biological systems morphostatic processes would include circulation and respiration; in social systems, socialization and control activities).

Morphogenesis refers to processes that elaborate or change the system, for example growth, learning, and differentiation. In adapting to the external environment, organizations typically become more differentiated in form. Also, as the environment confronting organizations becomes more complex, varied, and rapidly changing, organizations need to become increasingly flexible and adaptive.

Burns and Stalker (1961) refer to the two fundamental and contrasting organizational forms being discussed during this period as the *mechanistic* (harking back to the closed, rational organization of Taylor and Simon) and the *organic*. According to this categorization, mechanistic organizations are characterized by large-scale, low-complexity work activities and are best suited to stable environments that do not require adaptive change and innovation. Organic organizations are characterized by small-scale, high-complexity work and are better suited to changing environments that do require adaptation and innovation.

This discussion of alternative organizational forms led to increased consideration of *organizational design* and the idea that an appropriate organizational design was one that enabled "an organization to execute better, learn faster, and change more easily" (Mohrman et al. 1995:7). An organization's design comprises multiple, interrelated elements, frequently categorized as structure, people, processes, rewards, and tasks or work systems that together can create unique organizational capabilities that provide competitive advantage (Quinn et al. 1997; Galbraith 1973, 1994, 1995). Although the classic bureaucratic form may be the form of choice in a stable environment with low complexity, research was showing that rapid change and increased complexity required greater lateral mechanisms and a more organic form (Galbraith 1973, 1994; Burns and Stalker 1961; Hall 1962).

As attention shifted toward the organic organization, the management science literature gradually moved away from the view that management's role was to manage critical generic organizational functions toward the idea that managers needed to be leaders whose real added value was the provision of vision and direction that engaged the hearts and minds of employees, and subsequently, customers and external stakeholders (Hesselbein et al. 1996; see also Chapter 3). As this viewpoint matured, the central role of management was increasingly defined as encouraging motivational practices, facilitating creativity and innovation on the part of its employees, customers, and stakeholders, and ensuring the development of leaders throughout the organization. In other words, management's role was to unleash creativity and passion and harness these forces to promote the success of the organization (Kotter 1996; Deming 1994). This shifted the primary focus of management from the creation and implementation of organization structures to ensuring and leading organizational coordination, flexibility, and agility (Peters and Waterman 1982; Kotter and Heskett 1992).

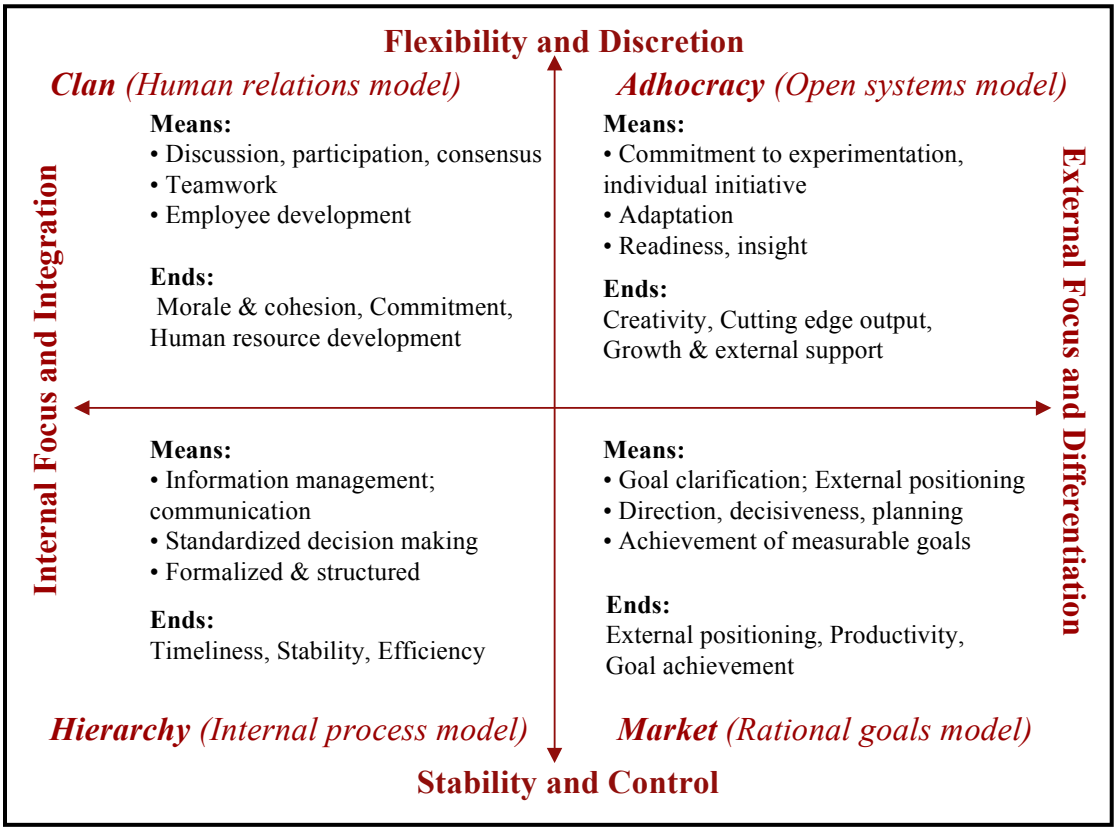
Dealing with Conflicting and Multiple Models: The Emergence of A Contingency Perspective on Organizational Design and Management

These discussions raised awareness of a need for a more complex view of organizational design and management, one that reflected the realization that although all organizations have to address common functions, different organizations may have different emphases and approaches. There was growing recognition that focusing on generic functions could mask the fact that there were, indeed, differing views and aspects of organizational effectiveness. Different functions – and different attributes within each of the functions – needed to be emphasized as organizations faced different internal and external challenges. Quinn and Rohrbaugh (1983) noted that different

conceptualizations of organizational effectiveness were associated with four common organizational perspectives, which they categorized as: (1) the *human relations* model; (2) the *open systems* model; (3) the *rational goal* model (closed systems perspective); and (4) the *internal process* model (closed system perspective). Using multivariate analysis, they found three "value dimensions" that underlay these different and seemingly conflicting conceptualizations of organizational effectiveness:

- Organization structure, which distinguishes between organizational flexibility/adaptability and control/stability
- Organizational focus, which distinguishes between an internal and an external orientation
- The means-ends continuum, which distinguishes between an emphasis on outcome objectives or the means by which these objectives are to be achieved, such as processes and/or important causal attributes.

Rohrbaugh (1983), Quinn and Rohbaugh (1983), and Quinn (1988) noted that organizations were likely to experience tension among organizational effectiveness attributes – for example, all organizations have a need for some level of stability as well as a need to be flexible and adaptable; a need for control and discipline as well as a need to allow some degree of freedom and autonomy; a need for rational formal structures and non-rational informal relations. They concluded that effectiveness depended upon the ability of an organization, and its managers, to strike the right balance among these critical attributes, as required by the organization's objectives and situation. This framework is illustrated in Figure 2. Jordan et al. (1999) applied



Source: Quinn (1988) and Rohrbaugh (1983).

Figure 2. The Competing Values Theory of Organizational Effectiveness

this model to U.S. national laboratories in studying what scientists value in their work environments.

Thompson (1967) employed an alternative strategy and attempted to reconcile these conflicting views of organizational effectiveness by distinguishing three organizational levels:

- The technical level, that part of the organization carrying on the productive function
- The managerial level, comprising those activities relating to the control of the production function
- The institutional level, consisting of those activities relating the organization to the larger community and institutional sectors.

He argued that the conflicting perspectives applied differently to these three levels and to different types of organizations. Organizations with routine production processes might attempt to seal off the technical level, protecting it from external uncertainties to the extent possible. Thus, the rational system perspective would be most relevant to this level. At the other extreme, the open system perspective of organizational effectiveness would most apply to the institutional level in most organizations. The problem is more challenging for scientific organizations, whose technical work and creativity depends upon active interaction with colleagues within and outside the organization. Here, the differences between production organizations and research organizations may prompt analysts to reverse the couplings – the technical/scientific level would be most suited to an open system perspective and the managerial and institutional levels to rational and bureaucratic models.

Along with the recognition that different attributes are important to different organizational types and, often, to different components of the same organization, organizational theorists and practitioners have continued to identify new critical performance attributes. The quality movement expanded the identification of critical performance attributes by moving beyond a focus on management processes to production processes and eventually to process performance in all areas (including areas that had previously received little attention, such as support services, infrastructure, and maintenance) (Lawler et al. 2001; Hammer and Champy 1994; Juran 1988**)**. The growing awareness of the complexity of organizations and organizational environments contributed to an emphasis on organizational differentiation and integration, information management, organizational learning, and most recently, what has come to be called *enterprise knowledge management* (Nonaka and Takeuchi 1995). The greater emphasis on corporate responsibility has given rise to additional critical performance dimensions, such as environmental stewardship, community service and stewardship, and sustainable design and growth (Carroll 1993; Miles 1987). The growing need for organizations to address rapid changes in the external environment, including radical and disruptive innovations that transform their environments and the market place, has resulted in additional attention being given to organizational competences in innovation, teamwork, change management, and partnerships (Hamel and Prahalad 1994; Hamel 1996, 2000; Christensen 1997; Christensen and Overdorf 2000).

As the list of potentially important organizational attributes grew to the point of being unwieldy and the extent of organizational diversity increased, greater emphasis was placed on developing more specific models of organizational effectiveness for particular organizations or for the most critical components of a given organization. This emphasis also reflected a growing recognition that the identification of individual organizational attributes or sets of organizational attributes does not adequately address the relationship among these attributes and how they combine to bring about critical performance results. Measuring and assessing all potentially important functions, therefore, does not constitute a truly explanatory model of organizational effectiveness.

While such an approach may provide a check on whether there are areas of potential concern, the most recent thinking indicates that it may need to be supplemented with models of organizational effectiveness that are more tailored to the specific requirements and objectives of the particular organization.

Lawrence and Lorsch (1967) coined the label *contingency theory* to capture the notion that different environmental contexts place different requirements on organizations. These differing requirements, combined with the fact that social systems (compared to biological systems) are loosely coupled with their environment, mean that there is no one best way to organize to respond to the environment – even if not all ways of organizing are equally effective. It also means that the expansion of organizational diversity will likely continue, accelerated by the growing availability of technological developments that increase the range of options for organizational systems.

Three general versions of these more tailored models are now being applied to the design and analysis of organizations:

- A tailored *critical attribute model* that is developed by determining an organization's most important performance dimensions and the associated critical attributes for achieving specific mission and objectives. An example of a tailored critical attribute model for a distribution organization might be a supply-chain model. For a manufacturing organization, it might be an agile manufacturing model combined with a life-cycle model. For an R&D organization, it might be an innovation model. For a government policy organization, it might be a combined stakeholder engagement and knowledge management model.
- A tailored *cause and effect model* that specifies the cause and effect logic chain for the organization. Because cause and effect logic models are unique to the individual organization, the identification and assessment of these critical causal attributes cannot be treated generically (Riesman 1994).
- Tailored *strategy models* that differ from cause and effect logic models by focusing less on the operational cause and effect logic than on the future strategy. Strategy is seen as the critical driver that determines what the organization should focus on and how its attributes need to change to help the organization achieve its desired future state. Kaplan and Norton's (1996) *Balanced Scorecard* approach to performance measurement, in contrast to the formulaic Baldrige performance criteria approach, suggests that defining the particular strategy and how this strategy is to be implemented is the best way to assess organizational effectiveness.

As part of this emphasis on increased diversity and dynamic interaction between the organization and its external environment, attention is focused on new, more fluid, organizational forms, such as loosely coupled, *network* type organizations (Powell et al. 1996), *virtual* organizations (Davidow and Malone 1992), and *boundaryless* organizations (Ashkenas et al. 1995). These new fluid organizational forms are more integrated with and less distinct from their environment. They do not merely respond to their environmental context but also attempt to influence and mold this environment. Lucas (1996) coined the term *T-form* to refer to these new fluid organizational forms because they have been enabled by technological advancements. He argues that technology infrastructures can allow formal organization structures to be highly fluid and, perhaps to a large extent, unnecessary.

New Organizational Logic

The evolution of the organization and management science literature represents a basic change in organization logic over time. The initial organizational logic was based on the closed, rational perspective; subsequently the logic was based on the natural, open perspective; most recently, a new logic has emerged that assumes an agile, environment-oriented, network system. The differences across these organizational logics are shown in Table 1.

Table 1. The Changing Logic of Organizations

LOGIC I	LOGIC II	LOGIC III
Bureaucratic Control	Engagement	Networking and Collaboration
Internal Orientation	External Awareness and Adaptation	External Positioning Orientation
Internally Oriented Hierarchical Relationships & Processes	Internally Oriented Lateral Relationships and Processes	Externally Oriented Relationships, Partnerships, and Alliances
Generic Organizational Design	Contingent Organizational Design	Flexible & Fluid Network Design
Organization Designed around Internal Functions	Organization Designed around Externally Oriented Products and Customers	Organization Designed to Effect Positioning in External Environment
Primary Value-Added Is Management	Value-Added of All Employees	Value-Added of Partnerships & Alliances
Management Focus	Leadership Focus	Facilitation Focus

Over time, the organization and management sciences literature has increasingly recognized the shortcomings of generic approaches. Focusing on generic functions can mask the fact that there are, indeed, differing views of organizational effectiveness. Although all organizations have to address some common functions, different organizations will have different emphases and approaches. Different functions and different attributes within each of the functions are likely to be emphasized by different types of organizations facing different internal and external challenges. This recognition has given rise to the identification of new performance functions, such as change management, organizational learning, knowledge management, organizational partnerships and network formation, innovation, and creativity. Organizations have become more differentiated and more and more topics are being addressed in the literature.

Although the bulk of the literature continues to focus on private sector business organizations, trends in this literature have made it more relevant to other types of organizations, including public science organizations. This literature is applied to public sector science organizations at two levels: (1) public science management organizations- -- those that set direction and provide funding for basic research (i.e., National Science Foundation, National Institutes of Health, the Department of Energy Office of Science, National Aeronautics and Space Administration, Environmental Protection Agency, National Institute of Standards and Technology, and others),

and (2) public science implementing organizations – i.e., the National Laboratories, the universities, and other research organizations that are supported with federal funds. Both types of public science-related organizations can benefit from understanding their own organizational and management structures and processes. Such an understanding can be the basis for changing or redesigning these structures, processes, and management strategies to align with the goals of productivity and innovation.

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